

Abstract

Measurements of Environmental Radon Using TLDs Revisited by Barbara C. Fields

Personnel at Lawrence Livermore National Laboratory (LLNL) have measured and reported gamma radiation at the Livermore Site perimeter since 1973. Gamma radiation results from natural background sources of geologic, terrestrial, and cosmic origin, as well as man-made sources such as fallout from past nuclear weapons testing, and contribution from LLNL operations. Direct gamma radiation data using thermoluminescent dosimeters (TLDs), collected over the past twenty years, show seasonal variation.

Previously, we hypothesized that such seasonal variation was due to elevated airborne radon concentrations caused by seasonal meteorological and local geological conditions. However, in an effort to answer questions concerning upward trends from the direct radiation monitoring network, we reassessed our data. As a result of this assessment, all of our quarterly data points since 1988 were normalized to standard 90-day quarters as is the practice of the Nuclear Regulatory Commission (Stuckmeyer 1994).

Data adjusted to standard quarters now show reduced variability. Some seasonal variation remains; gamma radiation appears to decrease during the rainy season, probably due to soil-bound water retarding radon emissions. Such a hypothesis is supported by an analysis of the variation during both wet and dry years.

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